

Common Parts of the Cell

Douglas Wilkin, Ph.D.
Jean Brainard, Ph.D.

Say Thanks to the Authors

Click <http://www.ck12.org/saythanks>

(No sign in required)

To access a customizable version of this book, as well as other interactive content, visit www.ck12.org

CK-12 Foundation is a non-profit organization with a mission to reduce the cost of textbook materials for the K-12 market both in the U.S. and worldwide. Using an open-content, web-based collaborative model termed the **FlexBook®**, CK-12 intends to pioneer the generation and distribution of high-quality educational content that will serve both as core text as well as provide an adaptive environment for learning, powered through the **FlexBook Platform®**.

Copyright © 2013 CK-12 Foundation, www.ck12.org

The names “CK-12” and “CK12” and associated logos and the terms “**FlexBook®**” and “**FlexBook Platform®**” (collectively “CK-12 Marks”) are trademarks and service marks of CK-12 Foundation and are protected by federal, state, and international laws.

Any form of reproduction of this book in any format or medium, in whole or in sections must include the referral attribution link <http://www.ck12.org/saythanks> (placed in a visible location) in addition to the following terms.

Except as otherwise noted, all CK-12 Content (including CK-12 Curriculum Material) is made available to Users in accordance with the Creative Commons Attribution-Non-Commercial 3.0 Unported (CC BY-NC 3.0) License (<http://creativecommons.org/licenses/by-nc/3.0/>), as amended and updated by Creative Commons from time to time (the “CC License”), which is incorporated herein by this reference.

Complete terms can be found at <http://www.ck12.org/terms>.

Printed: September 29, 2013

flexbook
next generation textbooks



AUTHORS

Douglas Wilkin, Ph.D.

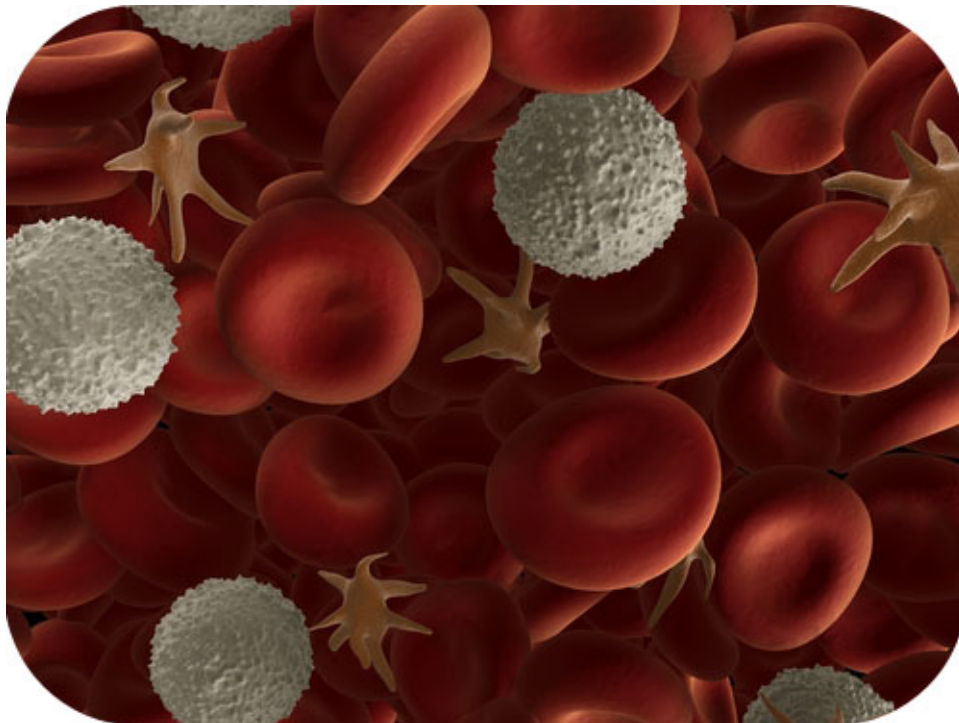
Jean Brainard, Ph.D.

CONCEPT

1

Common Parts of the Cell

- Identify the parts that all cells have in common.



What's the same between a bacterial cell and one of your cells?

There are many different types of cells, but they all have certain parts in common. As this image of human blood shows, cells come in different shapes and sizes. The shapes and sizes directly influence the function of the cell. Yet, all cells - cells from the smallest bacteria to those in the largest whale - perform some similar functions, so it is not surprising they have parts in common.

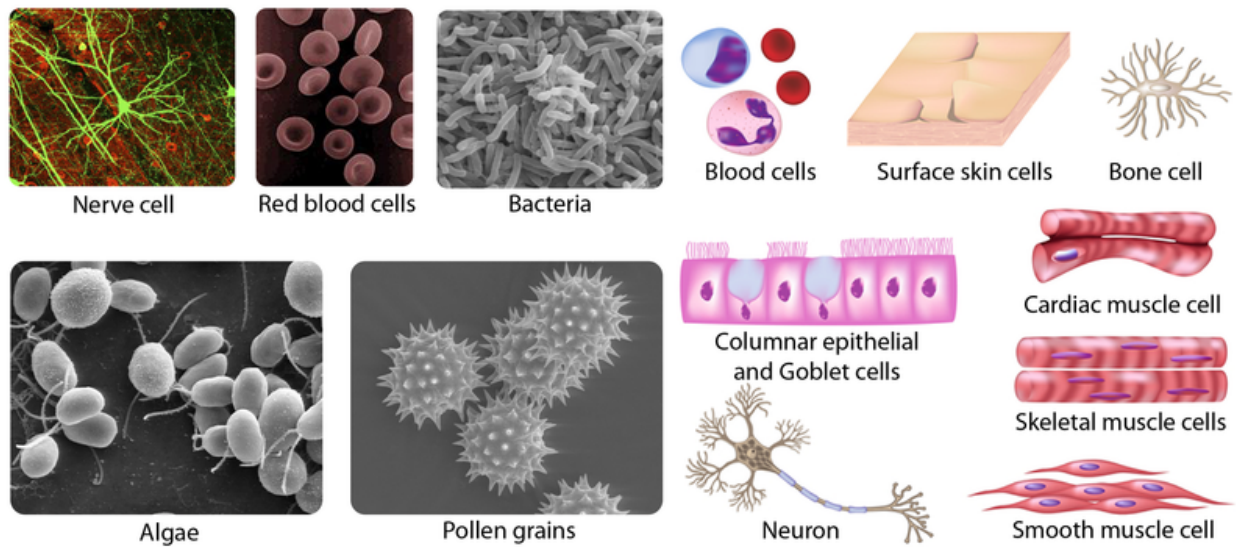
Common Parts of Cells

Cell Diversity

Cells with different functions often have different shapes. The cells pictured in **Figure 1.1** are just a few examples of the many different shapes that cells may have. Each type of cell in the figure has a shape that helps it do its job. For example, the job of the nerve cell is to carry messages to other cells. The nerve cell has many long extensions that reach out in all directions, allowing it to pass messages to many other cells at once. Do you see the tail-like projections on the algae cells? Algae live in water, and their tails help them swim. Pollen grains have spikes that help them stick to insects such as bees. How do you think the spikes help the pollen grains do their job?

Four Common Parts of a Cell

Although cells are diverse, all cells have certain parts in common. The parts include a plasma membrane, cytoplasm, ribosomes, and DNA.

**FIGURE 1.1**

As these pictures show, cells come in many different shapes. How are the shapes of these cells related to their functions?

1. The **plasma membrane** (also called the **cell membrane**) is a thin coat of lipids that surrounds a cell. It forms the physical boundary between the cell and its environment, so you can think of it as the “skin” of the cell.
2. **Cytoplasm** refers to all of the cellular material inside the plasma membrane, other than the nucleus. Cytoplasm is made up of a watery substance called **cytosol**, and contains other cell structures such as ribosomes.
3. **Ribosomes** are structures in the cytoplasm where proteins are made.
4. **DNA/RNA** (more on this to come) is a nucleic acid found in cells. It contains the genetic instructions that cells need to make proteins.

These parts are common to all cells, from organisms as different as bacteria and human beings. How did all known organisms come to have such similar cells? The similarities show that all life on Earth has a common evolutionary history.

Actually, and this part is amazing, there is strong support for the idea that all life that has ever existed has a common ancestor. This would be an ancient organism that all other organisms are generically related to. The organism is referred to as the last universal common ancestor (LUCA). So cool to me!

Summary

- Cells come in many different shapes.
- Cells with different functions often have different shapes.
- Although cells come in diverse shapes, all cells have certain parts in common. These parts include the plasma membrane, cytoplasm, ribosomes, and DNA/RNA.

Required Review

(In Science Notebook)

1. List and describe the four parts common to all cells.
2. What does it mean to say cells are diverse?
3. What is included in a cell's cytoplasm? What is in the cytosol?
4. Where is one location where ribosomes are found?

More, if you're interested

- Label the Structure of Bacteria at <http://www.neok12.com/diagram/Microorganisms-01.htm>.
- Animal Cell at <http://www.neok12.com/diagram/Cell-Structures-02.htm>.

References

1. (Nerve cell) WA Lee et al.; (Blood cell) Courtesy of National Institute of Health; (Bacteria) TJ Kirn, MJ Lafferty, CMP Sandoe, and RK Taylor; (Algae) EF Smith and PA Lefebvre; (Pollen) L Howard and C Daghljan. Cell illustrations copyright Alila Sao Mai, 2011. . (Nerve cell) CC-BY 2.5; (Blood cell) Public Domain; (Bacteria) Public Domain; (Algae) Public Domain; (Pollen) Public Domain; (Cell illustrations) Used under license from Shutterstock.com